

## SPECIFICATION

### FLOATABLE PANEL MOUNT CABLE ASSEMBLY

#### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** Relevant subject matter is disclosed in U.S. Patent Application Serial Nos. 10/658,563 filed on September 8, 2003 and entitled "ELECTRICAL CONNECTOR ASSEMBLY WITH BLIND MATE STRUCTURE", 10/665,843 filed on September 18, 2003 and entitled "SPACE-SAVING CABLE CONNECTOR ASSEMBLY WITH BLIND MATE STRUCTURE" and 10/671,117 filed on September 24, 2003 and entitled "CABLE CONNECTOR ASSEMBLY", all of which are invented by the same inventor and assigned to the same assignee as this application.

#### BACKGROUND OF THE INVENTION

##### 1. Field of the Invention

**[0002]** The present invention relates to a cable assembly, and particularly to a floatable panel mount cable assembly.

##### 2. Description of Related Art

**[0003]** Cable assemblies are widely used in electronic devices for signal or power transmission. Such a cable assembly is usually needed to be float-mounted to a panel on which plural connectors are arranged side by side to form a sub module. U.S. Patent Nos. 4,647,130 and 4,615,641 each disclose such an assembly.

**[0004]** The assembly disclosed in U.S. Patent No. 4,647,130 comprises

matable plug and receptacle connectors. The plug connector comprises a pair of flanges diagonally formed at opposite ends of a base thereof and a pair of guide pins disposed at opposite ends of the base and diagonally across from each other. Each flange defines a mounting hole therein and a pair of arcuate projections are located at a substantial angle from the major axis of the plug connector and are around corresponding mounting holes. A pair of elastomeric ring-like members are secured around a corresponding pair of projections. A pair of shoulder screws respectively protrude through the mounting holes and the elastomeric ring-like members to tightly engage with a panel. However, this design is complicated and increases the manufacturing cost.

**[0005]** U.S. Patent No. 4,915,641 discloses a pair of matable female and male connectors each being mounted to a corresponding pair of panels, respectively. The male connector comprises a pair of flanges on opposite ends thereof and each flange defines a mounting aperture and a mounting collar therethrough to enable the float mounting of the male connector to a corresponding panel. The collar is a generally cylindrical collar having an aperture dimensioned to receive a bolt, rivet or other connecting means. However, the flanges of the male connector occupy a relatively large space and the dimension of the male connector in a longitudinal direction thereof is thus increased. Further, when the female connector engages with or disengages from the male connector, the male connector is easy to rotate with respect to the panel, which results in the difficulty of ensuring a reliable electrical connection between the male connector and the female connector.

**[0006]** Hence, an improved floatable cable assembly is highly desired to overcome the disadvantages of the prior art.

## SUMMARY OF THE INVENTION

[0007] Accordingly, an object of the present invention is to provide a floatable panel mount cable assembly which can be prevented from rotating with respect to a panel when the cable assembly engages with or disengages from a complementary connector.

[0008] Another object of the present invention is to provide a panel mount cable assembly with a simplified structure and a minimized lengthwise dimension.

[0009] In order to achieve the objects set forth, a cable assembly adapter for being mounted in a mounting opening of a panel in accordance with the present invention comprises an insulative housing and a plurality of contacts received in the insulative housing. The housing includes a base along a longitudinal direction thereof, a mating portion extending forwardly from a front face of the base along a mating direction perpendicular to the longitudinal direction, a pair of mounting ears integrally formed at opposite ends of the base and a pair of guiding members forwardly extending from the base by two sides of the mating portion, respectively. A bulge is formed on the base adjacent a front face of the base. A pair of projections respectively extend downwardly from the guiding members. The bulge and the pair of projections are respectively adapted for engaging with a first and a second opposite faces of the panel.

[0010] Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a perspective view of a cable assembly in accordance with the present invention and a panel to which the cable assembly is mounted;

[0012] FIGS. 2 and 3 are views similar to FIG. 1, but taken from different

aspects;

[0013] FIG. 4 is a perspective view showing the cable assembly mounted on the panel to form a system;

[0014] FIG. 5 is a view similar to FIG. 4 but taken from a different aspect;

[0015] FIG. 6 is a front planar view of the system shown in FIG. 4;

[0016] FIG. 7 is a cross-section view taken along line 7-7 of FIG. 6;

[0017] FIG. 8 is a cross-section view taken along line 8-8 of FIG. 6; and

[0018] FIG. 9 is a cross-section view taken along line 9-9 of FIG. 6.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] Reference will now be made in detail to the preferred embodiment of the present invention.

[0020] Referring to FIGS. 1-3 and 7-9, a cable assembly 7 in accordance with the present invention, which is float-mounted on a panel 8 via a pair of fastening devices 6, comprises an insulative housing 1, a plurality of IDC (Insulation Displacement Contact) terminals 2 received in the insulative housing 1, a multi-conductor flat cable 3 electrically connecting with the terminals 2, a spacer 4 assembled to the insulative housing 1 for positioning insulation displacement sections of the terminals 2 and a termination cover 5 for being latchably mounted on the insulative housing 1. In a preferred embodiment, the cable assembly 7 is a SCA (Single Connector Attachment) cable assembly.

[0021] The insulative housing 1 is substantially elongated and comprises a base 10 and a mating portion 11 extending perpendicularly and forwardly from a front face 101 of the base 10. The insulative housing 1 has a front mating face 110 facing a complementary connector (not shown) and a terminating face 102 (FIG. 2) opposite to the mating face 110. The insulative housing 1 also defines a mating

direction and a longitudinal direction perpendicular to the mating direction.

**[0022]** A pair of guiding members 12 protrude forwardly from the base 10 at opposite ends of the mating portion 11 and beyond the mating face 110 of the insulative housing 1 for guiding the cable assembly 7 to correctly mate with a complementary connector (not shown). Each guiding member 12 defines a U-shaped receiving cavity 120 and is chamfered to form a lead-in 121 at a front end thereof. A pair of protrusions 13 extend downwardly from the guiding members 12 adjacent to the front face 101 of the base 10. A bulge 14 is formed on a lower face of the base 10. The distance between each protrusion 13 and the bulge 14 along the mating direction is slightly larger than a thickness of the panel 8. A pair of mounting ears 15 extend upwardly from an upper face of the base 10 and each is generally aligned with a corresponding one of the guiding members 12 along a transverse direction perpendicular to both the mating direction and the longitudinal direction of the insulative housing 1. Each mounting ear 15 defines a mounting hole 16 therethrough along the mating direction. The mounting hole 16 includes a front rectangular recess 160 in a front face 150 of the mounting ear 15, a rear circular recess 162 in a rear face 152 of the mounting ear 15, and a round hole 164 interconnecting the front rectangular recess 160 with the rear circular recess 162. The bulge 14 and the pair of projections 13 are located at opposite sides of the front face 150 of the mounting ear 15.

**[0023]** The insulative housing 1 defines a receiving space 111 in the mating face 110, a cavity 104 in the terminating face 102 and a plurality of passageways 112 in opposite longitudinal inner faces of the mating portion 11 and communicating with the cavity 104 and the receiving space 111. The base 10 defines a pair of channels 106 (FIG. 9) at opposite ends thereof and respectively communicating with the receiving cavities 120 of the guiding members 12. The base 10 is formed with a pair of mounting wedges 114 extending beyond the

terminating face 102 and adjacent the channels 106.

**[0024]** Referring to FIGS. 7 and 9, the terminals 2 are received in the passageways 112 of the insulative housing 1. Each terminal 2 comprises a retention section 20 secured in a corresponding passageway 112, a mating section 22 extending from one end of the retention section 20 with a curved mating end 220 exposed into the receiving space 111, and an insulation displacement section 24 extending from the other end of the retention section 20.

**[0025]** The spacer 4 is elongated and is made of insulative material. The spacer 4 is received in the cavity 104 of the insulative housing 1 and defines a plurality of slots 40 with the insulation displacement sections 24 of the terminals 2 extending therethrough for positioning purpose.

**[0026]** The termination cover 5 is assembled to a rear of the insulative housing 1 to perform electrical connections between the cable 3 and the insulation displacement sections 24 of the terminals 2. The termination cover 5 includes a main body 50, a pair of forwardly extending mounting lugs 52 at opposite ends thereof, and a pair of through holes 54 adjacent the mounting lugs 52. The main body 50 defines a plurality of grooves 500 in a front face thereof for receiving the insulation displacement sections 24 of the terminals 2. The pair of mounting lugs 52 of the termination cover 5 and the pair of mounting wedges 114 of the insulative housing 1 are respectively received in the channels 106 of the insulative housing 1 and the through holes 54 of the cover 5 to thereby latch with each other. Thus, the cover 5 is securely assembled to the insulative housing 1.

**[0027]** Referring to FIGS. 1-3 in conjunction with FIG. 8, each fastening device 6 comprises a washer 60, a hardware rivet 62 and a bolt 64. The washer 60 is assembled into the rear circular recess 162 from the rear face 152 of the mounting ear 15. The hardware rivet 62 is assembled into the mounting hole 16 from the front face 150 of the mounting ear 15 and includes a rectangular plate 620

received in the front rectangular recess 160, a cylindrical post 622 extending from the plate 620 and received in the round hole 164, and an annular end 624 located at a free end of the cylindrical post 622 and extending into the rear circular recess 162 through a through hole 602 of the washer 60. The rectangular plate 620 rearwardly abuts against an inner face of the front rectangular recess 160 and the annular end 624 forwardly abuts against the washer 60 to thereby retaining the washer 60 and the hardware rivet 62 in the mounting ear 15. The rivet 62 defines a screw hole 626 therein. The bolt 64 includes an enlarged head 640, a threaded portion 642 and a medial portion 644 interconnecting the enlarged head 640 and the threaded portion 642.

[0028] The panel 8 is a rectangular board and defines a mounting opening 80 in a center thereof and a pair of mounting apertures 82 located above the mounting opening 80 corresponding to the mounting holes 16 in the mounting ears 15.

[0029] Referring to FIGS. 4-6 in conjunction with FIGS. 7-9, when the cable assembly 7 is assembled to the panel 8, the mating portion 11 and the pair of guiding members 12 extend through the mounting opening 80 until the front faces 150 of the mounting ears 15 abut against a rear face 802 of the panel 8. The pair of projections 13 and the bulge 14 respectively abut against a front face 800 and the rear face 802 of the panel 8. The bolt 64 extends into the screw hole 626 through the mounting hole 82 of the panel 8 with the threaded portion 642 engaging with the screw hole 626 and with the medial portion 644 and the enlarged head 640 respectively abutting against the rectangular plate 620 of the rivet 62 and the panel 8. The diameter of the medial portion 644 is larger than the diameter of the screw hole 626 of the rivet 62 while is smaller than the diameter of the mounting aperture 82 of the panel 8. Therefore, the cable assembly 7 is floatably mounted on the panel 8.

[0030] When the complementary connector engages with or disengages from

the cable assembly 7, the cable assembly 7 tends to rotate about the fastening devices 6. Since the protrusions 13 and the bulge 14 respectively abut against the front face 800 and the rear face 802 of the panel 8, respectively, the cable assembly 7 is thus prevented from rotating when engaging with or disengaging from the complementary connector.

**[0031]** It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.